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Brian T. Holland

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EXAMINER

METZMAIER, DANIEL S

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/827,214	<b>Applicant(s)</b> HOLLAND ET AL.	
	<b>Examiner</b> Daniel S. Metzmaier	<b>Art Unit</b> 1762	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 Jan. 2010 & 26 July 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,8,10-29 and 32-37 is/are pending in the application.
- 4a) Of the above claim(s) 12-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,8,10,11 and 32-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/26/2010</u> .  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

Claims 1, 8, 10-29 and 32-37 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12 January 2010 and 26 July 2010 have been entered.

#### ***Election/Restrictions***

2. Applicant's election of Group I, claims 1-11 and 30-31, now claims 1, 8, 10-11 and 32-33, in the reply filed on 22 January 2007. The election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 12-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 22 January 2007.

Claims 1, 8, 10-11 and 32-37 have been examined on the merits.

#### ***Claim interpretation***

3. The claims are directed to a synthetic metal-containing colloidal silicate composition. Claim 1 is representative as follows:

1. A synthetic metal-containing colloidal silicate composition comprising:  
a metal-silicate lattice solid phase having colloidal particles,  
wherein said lattice exists in amorphous and generally spherical colloidal particles;

Art Unit: 1762

a metal dispersed within and incorporated into said lattice within the colloidal particles and present in an amount from about 0.01 wt% to about 35 wt%, based on silica; and  
a continuous aqueous phase.

Said materials are further characterized as having a “metal-silicate lattice microstructure”. The term “lattice” is undefined in applicants' disclosure. This is understood in the art as a crystalline atomic arrangement. The term “amorphous” is understood in the art as having a non-crystalline structure and/or lacking “lattice” structure. Applicants (page 2, lines 29-30) characterize the colloidal particles as amorphous and spherical in shape, which may be further processed to produce crystalline structure.

Two structures appear to be set forth as the “metal-silicate lattice microstructure” and the macrostructure as amorphous or crystalline structure (claims 36 and 37), wherein the microstructure results from the presence of the metal cation formation with the silicic acid forming the colloidal particles.

Clearly the claims are not limited to amorphous materials, including the independent claims since the claims recite open transitional language, i.e., “comprising”, and further processing may render the materials crystalline. See claims 36 and 37. Claims 36 and 37 are drafted in product-by-process format. Attention is directed to MPEP 2113 for claim analysis of product-by-process claim limitations.

### ***Double Patenting***

4. Applicant is advised that should claim 34 be found allowable, claim 33 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two

claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Claims 33 and 34 appear to have all of the same claim elements and/or limitations.

### ***Claim Objections***

5. Claims 32, 36<sup>1</sup> and 37 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 32, which depends on claim 1, sets forth the limitation that “the colloidal particles are generally spherical”. This limitation is present in claim 1, line 4 as “wherein said lattice exists in amorphous and generally spherical colloidal particles”.

Claims 36 and 37 are directed to materials that are claimed in “crystalline form”. Claims 1 and 34 are directed to amorphous colloidal particles having “metal-silicate lattice phase” dispersed therein, *i.e.*, “wherein said lattice exists in amorphous and generally spherical colloidal particles”. Since the treatment step to “further processed into crystalline form” is directed to crystalline particles and appears outside of the “amorphous particles” of claims 1 and 34, claims 36 and 37 are not seen to limit claims 1 and 34, respectively.

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<sup>1</sup> Claims 36 and 37 are objected to and alternatively rejected as indefinite. Said rejection follows the objection.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 10, 36 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term “the copolymerized metal” lacks proper antecedent basis.

Claims 36 and 37 are indefinite since the materials have been defined as amorphous and later converted to crystalline form. Claims 36 and 37 are indefinite since the claims are directed to compositions rather than processes. The materials are claimed as amorphous with a lattice phase. It is unclear how the further processing can still be amorphous or if the lattice claimed in the independent claims are intended to define crystalline materials.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Anticipated by Guy B. Alexander, US 2,974,108***

9. Claims 1, 8, 10 and 32-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Guy B. Alexander, US 2,974,108. Alexander (column 1, lines 15 et seq,

particularly lines 63-69) discloses aluminosilicates aquasols, "prepared by adding an aqueous solution of 'active silica' and an aqueous solution of alkali metal aluminate, such as sodium aluminate, simultaneously but separately to a body of aqueous alkali solution having a pH of 8 to 12".

Active silica (columns 1 to 2, lines 70 to 14) is formed by treating sodium silicate to cation exchange resin in the hydrogen form, *i.e.*, "silicic acid".

Alexander (column 4, lines 4 et seq) discloses the particles in the sols are amorphous and substantially spherical in shape. Alexander (columns 3 to 4, lines 73 to 3) discloses cations incorporated into the particles include alkali metals as well as tetramethyl ammonium.

While Alexander lacks the characterization of the materials as metal-silicate lattice solid phase in amorphous and generally spherical colloidal particles, discloses methods of separately but simultaneously adding metal source materials, *i.e.*, sodium aluminate, and silicic acid, *i.e.*, active silica, to an alkaline heel solution to form the colloidal solutions comprising amorphous and generally spherical colloidal particles. Applicants' characterization of metal-silicate lattice in the amorphous and generally spherical colloidal particles would have been inherent to the Alexander compositions since said compositions are made by the same or substantially the same process.

While aluminum does is not included in claim 10, the alkali metals are included therein. The stabilizer reads on the explicit disclosure of tetramethyl ammonium as a monovalent cation. The use of the tetramethyl ammonium is clearly envisaged in the Alexander reference.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

***Anticipated by or Obviousness over Taramasso et al, US 4,410,501***

12. Claims 1, 8, 10-11 and 32-37 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Taramasso et al, US 4,410,501, optionally evidenced by Tuel, "*Crystallization of titanium silicalite-1 from gels containing hexanediamine and tetrapropylammonium bromide*", Original Research Article *Progress in Zeolite and Microporous Materials*, Studies in Surface Science and Catalysis, (Chon et al Editors), Volume 105, 1997, Pages 261-268. Taramasso et al (abstract) is directed to titanium silicalite (TS-1) and the preparation thereof.



Taramasso et al (column 1, lines 32-54) disclose the molar reagent ratio (*e.g.*,  $\text{SiO}_2/\text{TiO}_2 = 35\text{-}65/1$ ) and the TS-1 formula ratios (*e.g.*,  $x\text{TiO}_2(1-x)\text{SiO}_2$ , wherein  $x = 0.0001\text{-}0.04$ , or  $0.01\text{-}0.025$ ). At a molar reagent ratio of  $\text{SiO}_2/\text{TiO}_2 = 50$ , (the median point of the Taramasso et al preferred range) the  $\text{TiO}_2$  equates to about 2.5 wt % based on  $\text{SiO}_2$ . The TS-1 formula ratio, wherein  $x = 0.0001$ , corresponds to  $\text{TiO}_2$  content of about 0.01 wt % based on  $\text{SiO}_2$ . The TS-1 formula ratio, wherein  $x = 0.04$ , corresponds to  $\text{TiO}_2$  content of about 5 wt % based on  $\text{SiO}_2$ . These values are all encompassed by the claimed range.

Taramasso et al (examples) discloses the formation of TS-1 employing TPAOH (tetrapropylammonium hydroxide) with various silica and titania source materials (see also column 3, lines 11-19). Taramasso et al (examples) further discloses the formation of the materials under intermittent or constant stirring.

Taramasso et al (column 3, lines 20-25) disclose the **TS-1 precursor are hydrothermally treated until crystals of the TS-1 precursor are formed.**

The instant claims read on the TS-1 precursor materials of the Taramasso et al reference, which inherently would have the properties as claimed (*i.e.*, amorphous generally spherical colloidal particles containing a metal-silicate lattice solid phase as claimed).

The Taramasso et al disclosed TS-1 precursors are clearly amorphous since they require hydrothermal treatment until crystallization. The generally spherical colloidal particles would be expected by the Taramasso et al methods, which (i) includes stirring of the colloidal and/or sub-colloidal source materials to for the TS-1

precursor, (ii) the TS-1 crystals are characterized as fine particle crystals (column 4, line 19) and (iii) the amorphous nature of the TS-1 precursors would be expected to exist in generally spherical colloidal particle form due to the amorphous structure.

Claims 36 and 37 clearly read on the hydrothermal treated materials of the Taramasso et al reference.

Furthermore, Tuel (abstract) discloses synthesis of TS-1 employing hexanediamine or tetrapropylammonium bromide. Tuel (page 261) teaches TPAOH and TPABr as templating materials in making the TS-1. Tuel (page 262) discloses conventional TS-1 as prepared with TPAOH. Tuel (page 263) contrast the TPABr made TS-1 with the conventional TPAOH TS-1 materials and characterizes the conventional TPAOH TS-1 materials as generally very small and round-shaped. The claimed properties of “generally spherical colloidal particle” would have been inherently expected by those having ordinary skill in the art at the time of applicants invention as evidenced by Tuel.

To the extent the Taramasso et al materials differ from the claims in the characterization of the properties as amorphous generally spherical colloidal particles containing a metal-silicate lattice solid phase as claimed, some variation in the properties of the Taramasso et al materials would have been expected based on the teachings in the Taramasso et al reference (*e.g.*, variations of titanium in the TS-1 precursors formed, the silica and titania source materials, and process limitations).

*Obviousness over Guy B. Alexander, US 2,974,108*

13. Claims 1, 8, 10-11 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guy B. Alexander, US 2,974,108. Alexander discloses colloidal compositions as set forth in the above rejection by the Alexander '108 reference. The reasoning and citations set forth above are herein incorporated by reference.

To the extent Alexander differs from claim 11 in the exemplified and/or explicit characterization of the "metal-silicate solid phase", Alexander discloses (claim 1) a molar ratio of aluminum to silicon of up to 1 to 50. At a molar ratio of 1 mole of aluminum to 50 moles of silicone, it equates to about 0.9 wt % of Al based on SiO<sub>2</sub>. It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to employ a metal to silicone molar ratio as taught in the Alexander reference.

To the extent Alexander differs from claims 33-35 in the exemplified inclusion of quaternary amine (ammonium) in the compositions, Alexander (column 3, lines 9-18) discloses simultaneously with the preparation of the sol may be cation exchanged with substituted ammonium, *e.g.*, tetramethyl ammonium (column 4, line 3). It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to employ tetramethyl ammonium cation for the advantage of producing an essentially alkali metal free colloidal composition.

The remaining claims are included herein as they are generic to the stabilizer limitations.

### ***Response to Arguments***

14. Applicant's arguments filed 12 January 2010 have been fully considered but they are not persuasive.

Art Unit: 1762

15. The Cundy et al, "Some observations on the preparations and properties of colloidal silicalites. Part I: Synthesis of colloidal silicalite-1 and titanosilicalite-1 (TS-1)", Microporous and Mesoporous Materials, 66 (2003), pages 143-156, reference has been withdrawn in light of the Declaration filed on 12 January 2010 (filed under 37 CFR 1.131).

16. Applicant's arguments with respect to claims 1, 8, 10-11 and 32-37 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

EP 109060, published in 1984, discloses the coprecipitation during the formation of silicalite-1 with chromium metal salts as well as alkaline earth metals. Specific attention is directed to the instant specification at page 4, lines 23-24; page 5, lines 20-21; page 8, lines 1-2; page 9, lines 23-26; and particularly page 16, line 4 et seq to Synthesis Procedure Three.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (571) 272-1089. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David W. Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1762

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/Daniel S. Metzmaier/  
Primary Examiner, Art Unit 1762**

DSM